

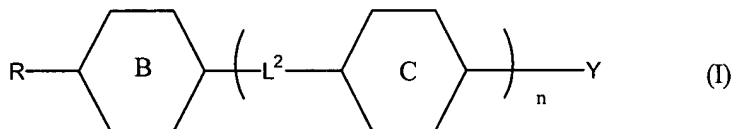
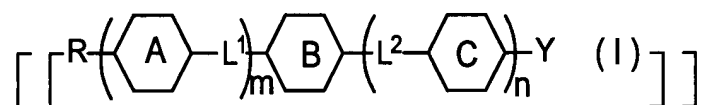
U.S. Patent Application Serial No. 10/030,185  
Amendment filed October 19, 2004  
Reply to AA dated September 1, 2004 and  
FOA dated May 19, 2004

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

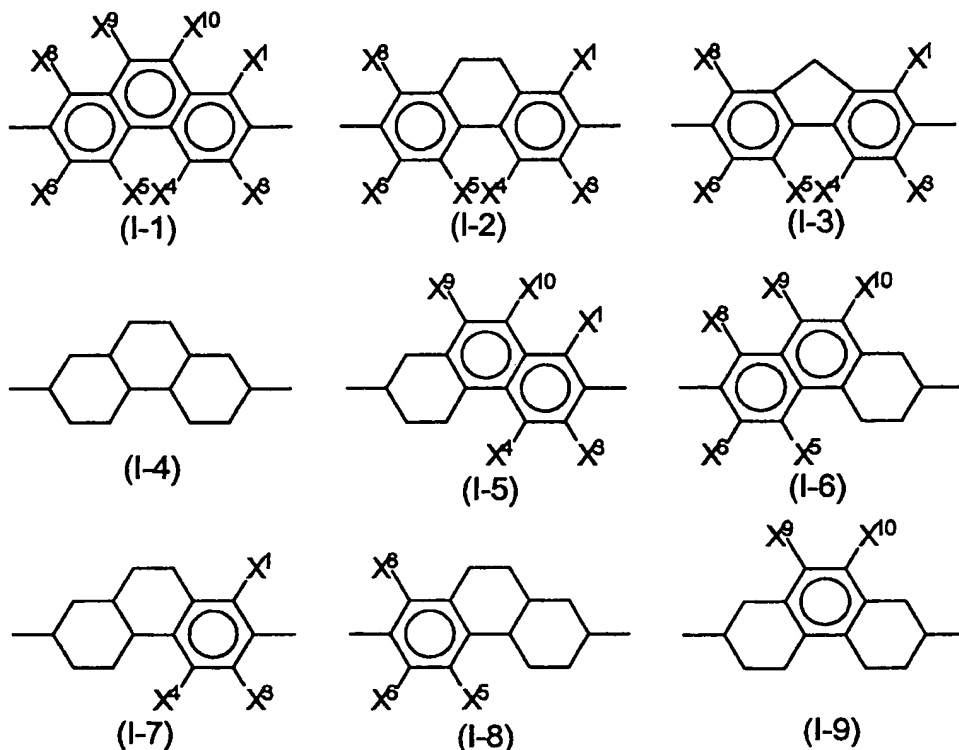
**Listing of Claims:**

**Claim 1 (currently amended):** A fused ring compound represented by a general formula (I)



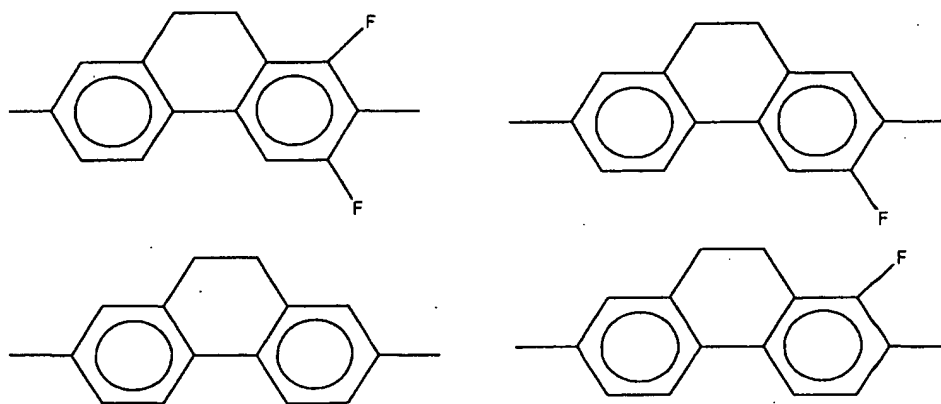
(wherein, R represents an alkyl group or alkoxy group of 1 to 16 carbon atoms, an alkenyl group of 2 to 16 carbon atoms, an alkenyloxy group of 3 to 16 carbon atoms, or an alkyl group of 1 to 12 carbon atoms substituted with an alkoxy group of 1 to 10 carbon atoms, and said groups may be substituted with a halogen, and in cases in which an asymmetric carbon arises due to substitution or branching, may be either one of optically active and a racemic mixture; ~~ring A and ring C each represent, independently, represents~~ any one of a trans-1,4-cyclohexylene group in which one CH<sub>2</sub> structure within said group or two or more non-adjacent CH<sub>2</sub> structures within said group may be

replaced with -O- and/or -S-, a 1,4-phenylene group in which one CH structure within said group or two or more non-adjacent CH structures within said group may be replaced with -N=, a 1,4-cyclohexenylene group, a 1,4-bicyclo(2.2.2)octylene group, a piperidine-1,4-diyl group, a naphthalene-2,6-diyl group, a trans-decahydronaphthalene-trans-2,6-diyl group, and a 1,2,3,4-tetrahydronaphthalene-2,6-diyl group, and said groups may be substituted with either one of a cyano group and a halogen; ring B represents any one of general formulas (I-1) to (I-9)

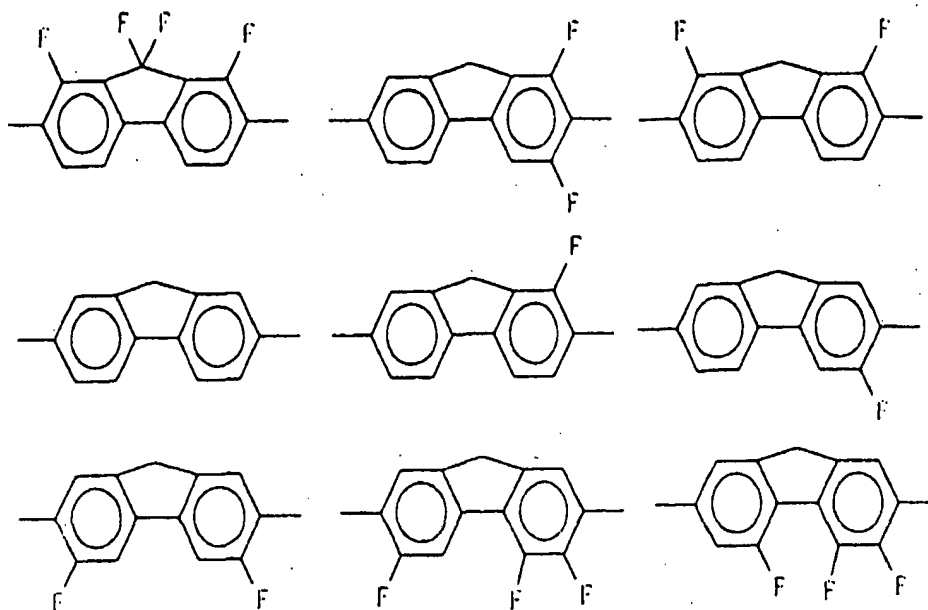


(wherein,  $X^1$ ,  $X^3$ ,  $X^4$ ,  $X^5$ ,  $X^6$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  each represent, independently, any one of a hydrogen atom, a chlorine atom and a fluorine atom, provided that conditions described below are satisfied:

- a. in (I-1), in a case in which at least one of  $X^3$ ,  $X^4$ ,  $X^5$  and  $X^6$  represents a fluorine atom, and a remainder represent hydrogen atoms, then at least one of  $X^1$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  represents either one of a chlorine atom and a fluorine atom,
- b. in (I-1), in a case in which at least one of  $X^1$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  represents a fluorine atom, and a remainder represent hydrogen atoms, then at least one of  $X^3$ ,  $X^4$ ,  $X^5$  and  $X^6$  represents either one of a chlorine atom and a fluorine atom,
- c. in (I-4) to (I-9), hydrogen atoms within a ring may be replaced with a cyano group or a halogen);
- d. in (I-2), ring B represents any one of general formulas as follows:



and in (I-3), ring B represents any one of general formulas as follows:



[[ $L^1$  and]]  $L^2$  ~~each represent, independently,~~ represents any one of  $-\text{CH}_2\text{CH}_2-$ ,  $-\text{C}\equiv\text{C}-$ ,  $-(\text{CH}_2)_4-$ ,  $-\text{CF}=\text{CF}-$ ,  $-\text{OCH}_2-$ ,  $-\text{CH}_2\text{O}-$ ,  $-\text{OCF}_2-$ ,  $-\text{CF}_2\text{O}-$ ,  $-\text{CO}_2-$ ,  $-\text{OCO}-$ ,  $-\text{CH}=\text{N}-\text{N}=\text{CH}-$ ,  $-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}_2-$ ,  $-\text{CH}_2-\text{CH}_2-\text{CH}=\text{CH}-$  and a single bond;  $m$  ~~represents 0,~~ and  $n=1$  or  $m=1$  and  $n=0$  or  $m=0$  and  $n=0$  and  $n$  ~~represents 0 or 1~~  $n$  represents 0 or 1, then ~~at least one of  $L^1$  and  $L^2$ ,~~ when present, represents a single bond; Y represents any one of a hydrogen atom, a fluorine atom, a chlorine atom, a trifluoromethoxy group, a difluoromethoxy group, a trifluoromethyl group, a 3,3,3-trifluoroethoxy group, a cyano group, a straight chain alkyl group of 1 to 16 carbon atoms, a straight chain alkenyl group of 2 to 16 carbon atoms, a straight chain alkyloxy group of 1 to 12 carbon atoms, and a straight

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chain alkenyloxy group of 2 to 16 carbon atoms, provided that cases described below are excluded:

- i. a case in which ring B represents (I-2), ~~[[m and]] n represent~~ represents 0, R represents an alkyl group and Y represents an alkyl group,
- ii. a case in which ring B represents (I-3), ~~[[m and]] n represent~~ represents 0, R represents an alkyl group and Y represents an alkoxy group,
- iii. a case in which ring B represents (I-4), ~~[[m and]] n represent~~ represents 0, R represents an alkyl group and Y represents either one of an alkyl group and a cyano group,
- iv. a case in which ring B represents (I-8), ~~[[m and]] n represent~~ represents 0, R represents an alkyl group and Y represents an alkyl group,
- v. a case in which ring B represents (I-4), ~~m represents 0 and~~ n represents 1, ring C represents a 1,4-phenylene group,  $L^2$  represents  $-CO_2-$ , R represents an alkyl group and Y represents any one of an alkyl group, an alkoxy group and a cyano group,
- vi. a case in which ring B represents (I-4), ~~m represents 0 and~~ n represents 1, ring C represents a 1,4-phenylene group,  $L^2$  represents  $-OCO-$ , R represents an alkyl group and Y represents an alkoxy group,
- vii. a case in which ring B represents (I-2), ~~m represents 0 and~~ n represents 1, ring C represents a 1,4-cyclohexylene group,  $L^2$  represents  $-CO_2-$ , R represents an alkyl group and Y represents an alkyl group,
- viii. a case in which ring B represents (I-1), and  $X^9$  and  $X^{10}$  represent fluorine atoms, and
- ix. a case in which ring B represents (I-3), and  $X^3$ ,  $X^4$ ,  $X^5$  and  $X^6$  simultaneously represent fluorine

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atoms, and applying similarly to compounds equivalent to those above described using combinations of abbreviations).

**Claim 2 (currently amended):** A compound according to claim 1, wherein ~~ring A and ring C each represent, independently,~~ represents a 1,4-phenylene group or a trans-1,4-cyclohexylene group which may be substituted with at least one fluorine atom.

**Claim 3 (currently amended):** A compound according to claim 1, wherein  $[[L^1 \text{ and}]] L^2$  ~~each represent, independently,~~ represents any one of -OCO-, -CO<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>- and a single bond.

**Claim 4 (canceled).**

**Claim 5 (currently amended):** A compound according to claim 1, wherein  $[[L^1 \text{ and}]] L^2$  ~~each represent~~ represents a single bond.

**Claim 6 (currently amended):** A compound according to claim 1, wherein ring B represents (I-3) or (I-4) ~~which may be substituted with a halogen.~~

**Claims 7-8 (canceled).**

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**Claim 9 (currently amended):** A compound according to claim 1, wherein ~~ring A and ring C each represent, independently, represents~~ a 1,4-phenylene group or a trans-1,4-cyclohexylene group which may be substituted with ~~[[a]]~~ at least one fluorine atom, and ring B represents any one of (I-1), (I-2), (I-3) and (I-4) ~~which may be substituted with a halogen.~~

**Claim 10 (currently amended):** A compound according to claim 1, wherein ~~ring A and ring C each represent, independently, represents~~ a 1,4-phenylene group or a trans-1,4-cyclohexylene group which may be substituted with ~~[[a]]~~ at least one fluorine atom, ring B represents any one of (I-1), (I-2), (I-3) and (I-4) ~~which may be substituted with a halogen, and [[L<sup>1</sup> and]] L<sup>2</sup> each represent~~ represents a single bond.

**Claim 11 (currently amended):** A compound according to claim 1, wherein ~~ring A and ring C each represent, independently, represents~~ a 1,4-phenylene group or a trans-1,4-cyclohexylene group which may be substituted with ~~[[a]]~~ at least one fluorine atom, ring B represents any one of (I-1), (I-2), (I-3) and (I-4) ~~which may be substituted with a halogen, m represents 0 and n represents 1, and~~ L<sup>2</sup> represents a single bond.

**Claim 12 (canceled).**

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**Claim 13 (previously presented):** A compound according to claim 1, wherein R represents either one of a straight chain alkyl group of 1 to 12 carbon atoms and a straight chain alkenyl group of 2 to 12 carbon atoms, and Y represents any one of a fluorine atom, a chlorine atom, a trifluoromethoxy group, a trifluoromethyl group, a difluoromethoxy group, a 3,3,3-trifluoroethoxy group and a cyano group.

**Claim 14 (original):** A liquid crystal composition incorporating at least one compound according to any one of claims 1 through 13.

**Claim 15 (original):** A liquid crystal display element utilizing a liquid crystal composition according to claim 14.

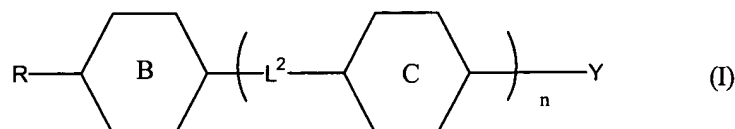
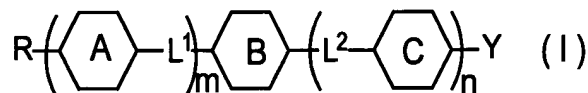
**Claim 16 (original):** An active matrix driven liquid crystal display element utilizing a liquid crystal composition according to claim 14.

**Claim 17 (original):** A supertwisted nematic liquid crystal display element utilizing a liquid crystal composition according to claim 14.



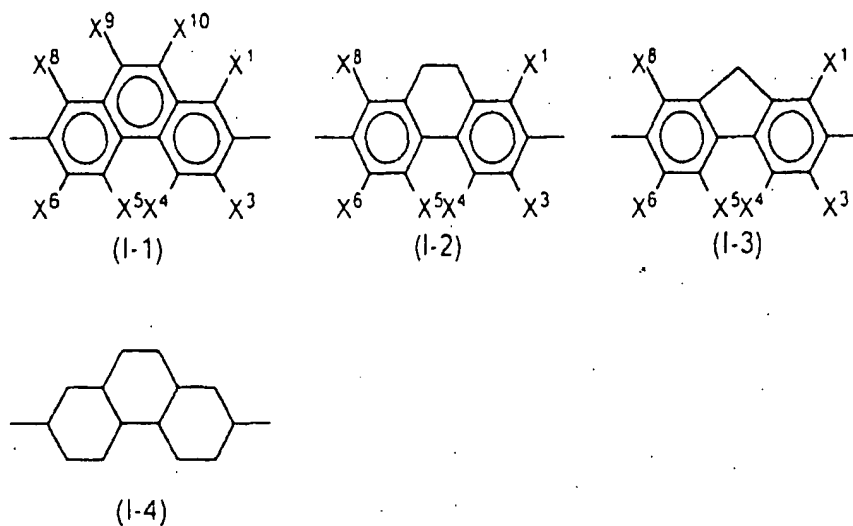
**Claim 18 (currently amended):** A fused ring compound represented by a general formula

(I)



(wherein, R represents an alkyl group or an alkyl group of 1 to 12 carbon atoms substituted with an alkoxyl group of 1 to 10 carbon atoms, and said groups may be substituted with a halogen, and in cases in which an asymmetric carbon arises due to substitution or branching, may be either one of optically active and a racemic mixture; ~~ring A and ring C each represent, independently, represents~~ any one of a trans-1,4-cyclohexylene group in which one CH<sub>2</sub> structure within said group or two or more non-adjacent CH<sub>2</sub> structures within said group may be replaced with -O- and/or -S-, a 1,4-phenylene group in which one CH structure within said group or two or more non-adjacent CH structures within said group may be replaced with -N=, a 1,4-cyclohexenylene group, a 1,4-bicyclo(2.2.2)octylene group, a piperidine-1,4-diyl group, a naphthalene-2,6-diyl group, a trans-decahydronaphthalene-trans-2,6-diyl group, and a 1,2,3,4-tetrahydronaphthalene-2,6-diyl group, and said groups may be substituted with either one of a cyano group and a halogen; ring B represents any

one of general formulas (I-1) to (I-4)



(wherein,  $X^1$ ,  $X^3$ ,  $X^4$ ,  $X^5$ ,  $X^6$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  each represent, independently, any one of a hydrogen atom, a chlorine atom and a fluorine atom, provided that conditions described below are satisfied:

a. in (I-1) and (I-2), in a case in which at least one of  $X^3$ ,  $X^4$ ,  $X^5$  and  $X^6$  represents a fluorine atom, and a remainder represent hydrogen atoms, then at least one of  $X^1$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  represents either one of a chlorine atom and a fluorine atom,

b. in (I-1) and (I-2), in a case in which at least one of  $X^1$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  represents a fluorine atom, and a remainder represent hydrogen atoms, then at least one of  $X^3$ ,  $X^4$ ,  $X^5$  and  $X^6$  represents either one of a chlorine atom and a fluorine atom, and

c. in (I-3) to (I-4), hydrogen atoms within a ring may be replaced with a cyano group or a halogen);

$E^+$  represents any one of  $\text{CH}_2\text{CH}_2$ ,  $\text{C}\equiv\text{C}$ ,  $(\text{CH}_2)_4$ ,  $\text{CF}=\text{CF}$ ,  $\text{OCH}_2$ ,  $\text{CH}_2\text{O}$ ,  $\text{OCF}_2$ ,  $\text{CF}_2\text{O}$ ,

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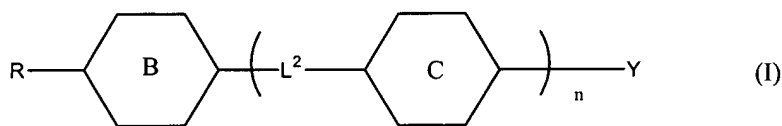
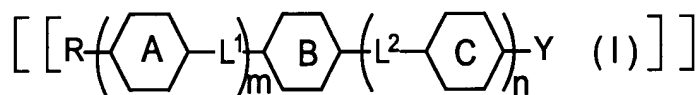
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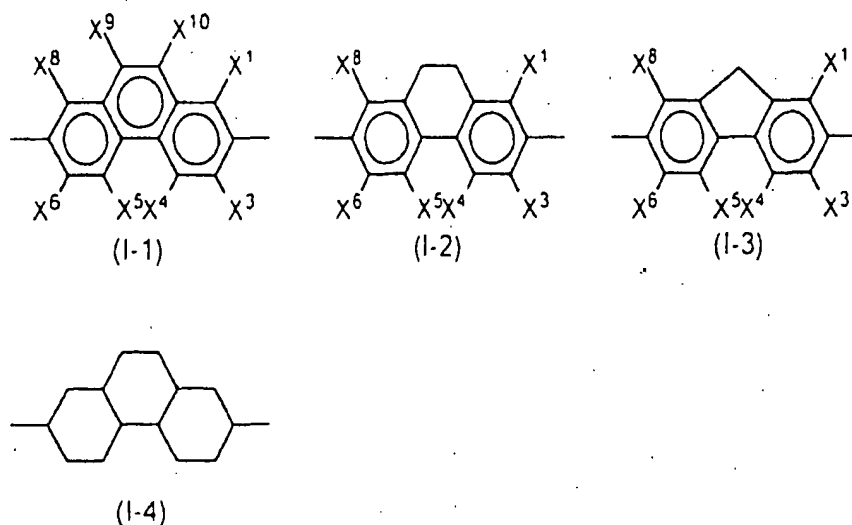
~~-CO<sub>2</sub>-, -OCO-, -CH=N-N=CH-, -CH=CH-CH<sub>2</sub>-CH<sub>2</sub>-, -CH<sub>2</sub>-CH<sub>2</sub>-CH=CH-~~ and a single bond; L<sup>2</sup> represents a single bond, m represents 0, and n represents 1, then at least one of L<sup>1</sup> or L<sup>2</sup>[[,]] when present, represents a single bond; and Y represents a fluorine atom.

**Claim 19 (currently amended):** A fused ring compound represented by a general formula

(I)



(wherein, R represents an alkyl group or alkoxyl group of 1 to 16 carbon atoms, an alkenyl group of 2 to 16 carbon atoms, an alkenyloxy group of 3 to 16 carbon atoms, or an alkyl group of 1 to 12 carbon atoms substituted with an alkoxyl group of 1 to 10 carbon atoms, and said groups may be substituted with a halogen, and in cases in which an asymmetric carbon arises due to substitution or branching, may be either one of optically active and a racemic mixture; ~~ring A and ring C each represent, independently, represents~~ a trans-1,4-cyclohexylene group which may be substituted with a fluorine atom, or a 1,4-phenylene; and ring B represents any one of general formulas (I-1) to (I-4)



(wherein,  $X^1$ ,  $X^3$ ,  $X^4$ ,  $X^5$ ,  $X^6$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  each represent, independently, any one of a hydrogen atom, a chlorine atom and a fluorine atom, provided that conditions described below are satisfied:

a. in (I-1) and (I-2), in a case in which at least one of  $X^3$ ,  $X^4$ ,  $X^5$  and  $X^6$  represents a fluorine atom, and a remainder represent hydrogen atoms, then at least one of  $X^1$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  represents either one of a chlorine atom and a fluorine atom,

b. in (I-1) and (I-2), in a case in which at least one of  $X^1$ ,  $X^8$ ,  $X^9$  and  $X^{10}$  represents a fluorine atom, and a remainder represent hydrogen atoms, then at least one of  $X^3$ ,  $X^4$ ,  $X^5$  and  $X^6$  represents either one of a chlorine atom and a fluorine atom, and

c. in (I-3) to (I-4), hydrogen atoms within a ring may be replaced with a halogen);

$L^2$  represents a single bond; ~~m represents 0~~ and n represents 1.